

Analysis of Prognostic Factors in Ewing Sarcoma Using a Population-Based Cancer Registry

Joe Lee, M.D.

Bang Hoang, M.D.

Argyrios Ziogas, Ph.D.

Jason Zell, D.O., M.P.H.

UNIVERSITY OF CALIFORNIA • IRVINE

ORTHOPÆDIC SURGERY

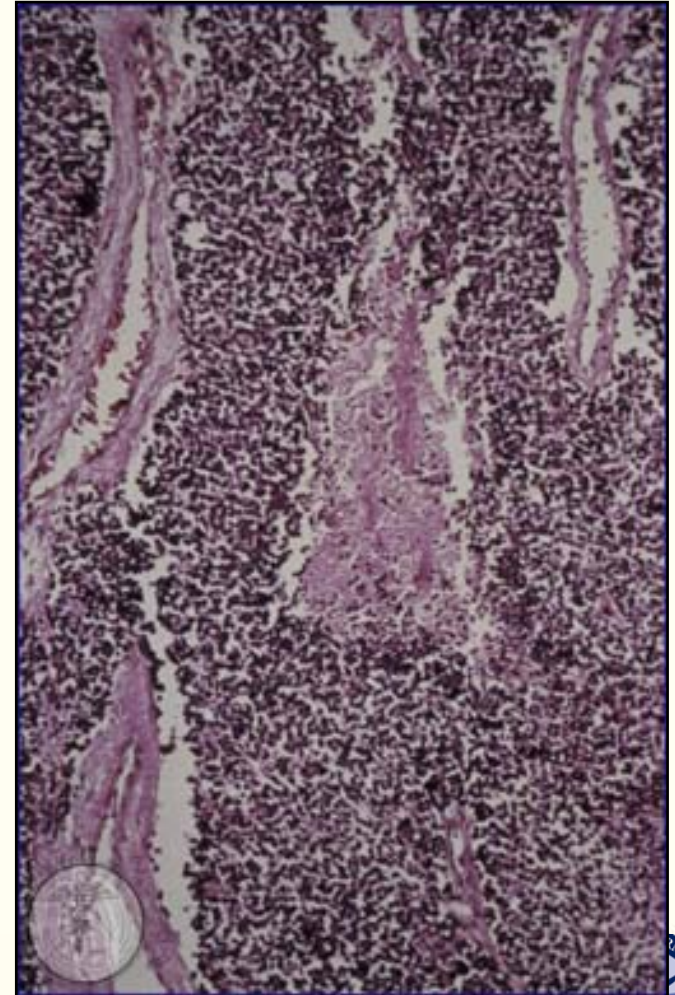
Analysis of Prognostic Factors in Ewing Sarcoma Using a Population-Based Cancer Registry

Joe Lee, M.D.

I have no potential conflicts
with this presentation.

Background

- Small, round-cell tumor
- Mostly in children and adolescents
- Data mainly from retrospective series at single institutions
- Little known about epidemiology



California Cancer Registry

- Established in 1985, with cancer being a reportable disease in California
- Part of the National Cancer Institute's Surveillance, Epidemiology, and End Results program (SEER)
- Case reporting 99% for entire state, with follow-up completion rates exceeding 95%

Purpose

- Using the CCR, we examined the outcome of children and adult patients with Ewing sarcoma and determined the relevant prognostic factors for survival.

Methods

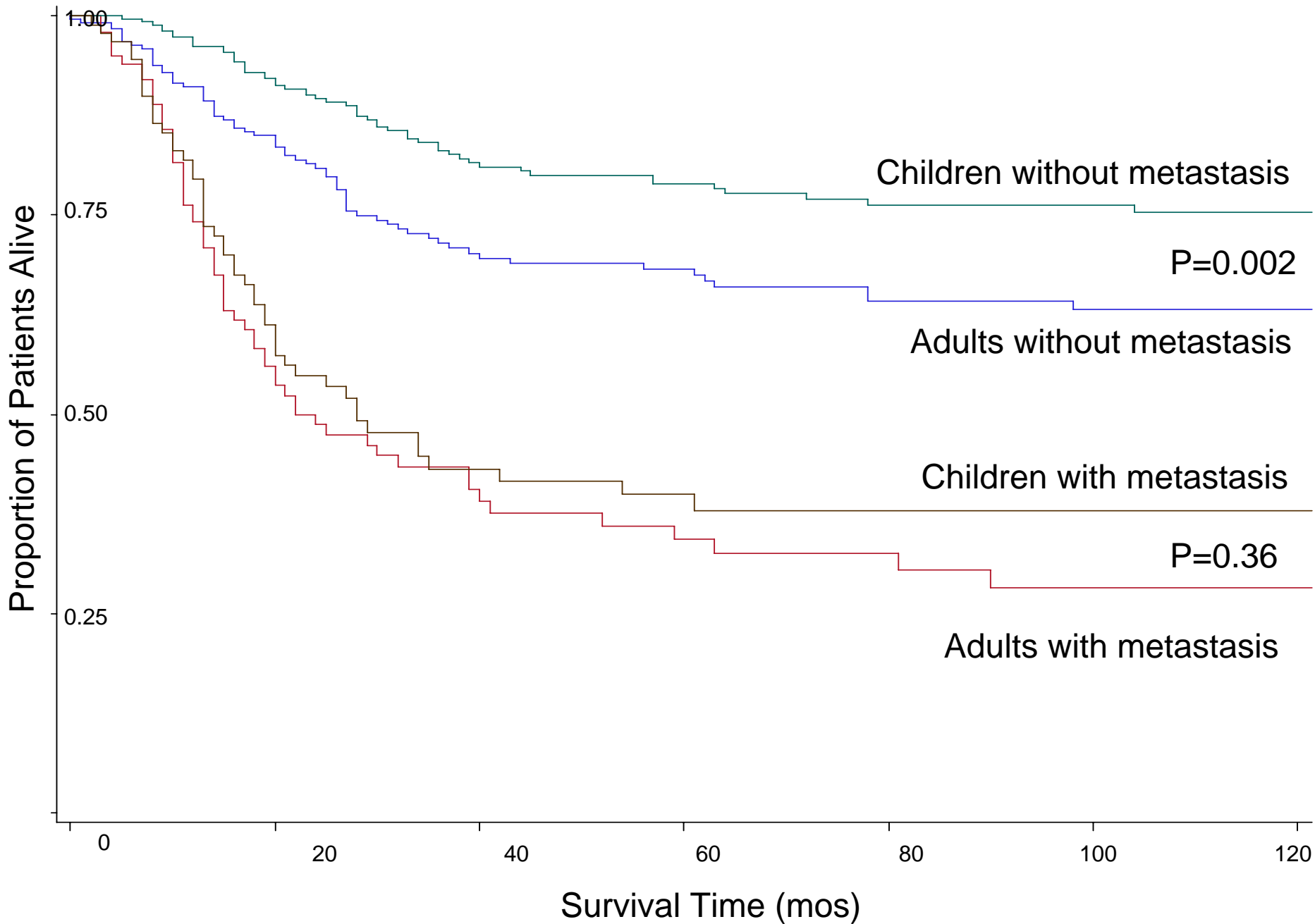
- Retrospective review of Ewing's sarcoma cases in CCR 1989-2007
- 725 patient cases
- Variables: age, race, sex, SES, metastasis, tumor location, tumor size, chemotherapy, radiation, and primary surgery

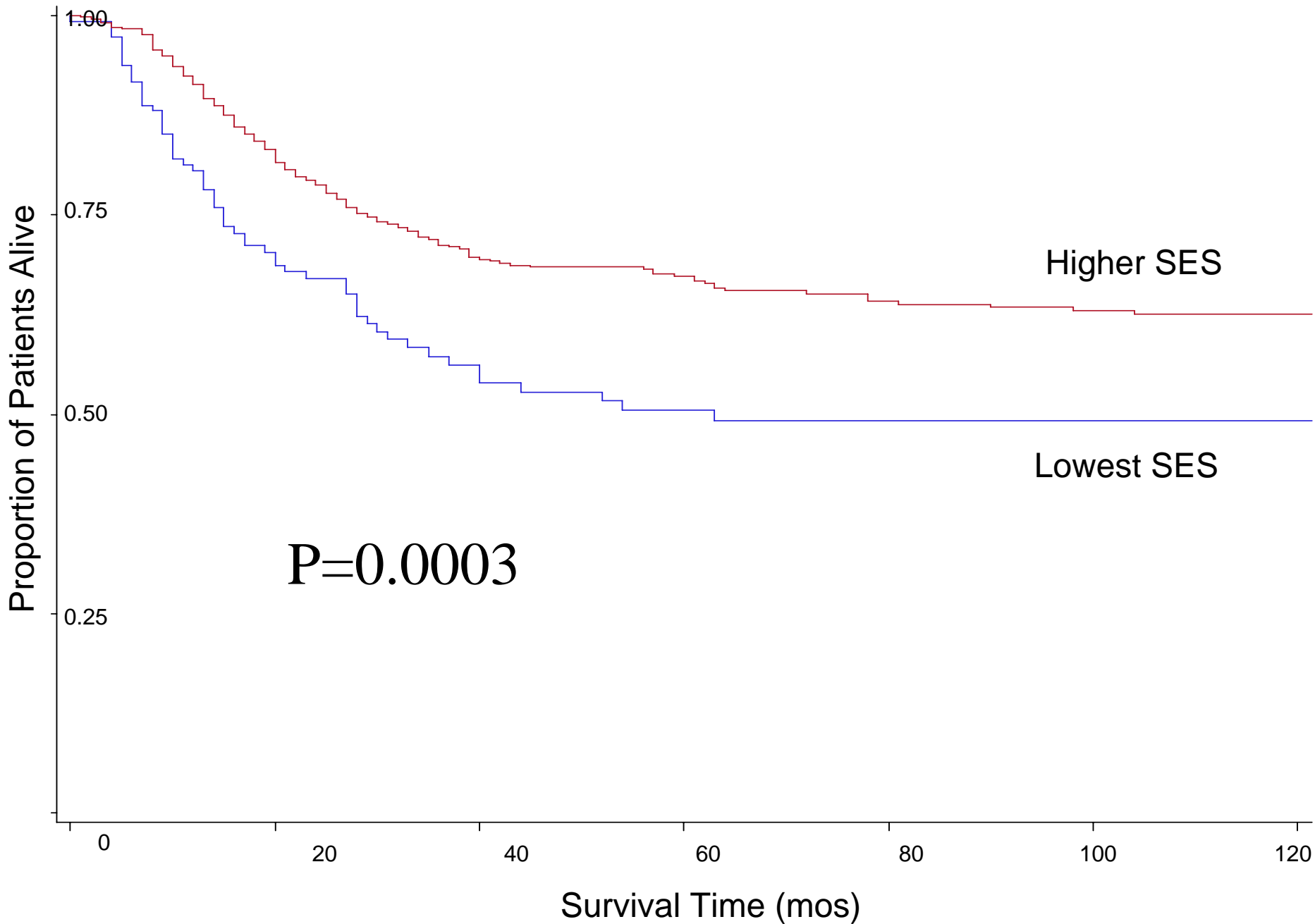
Patient Demographics

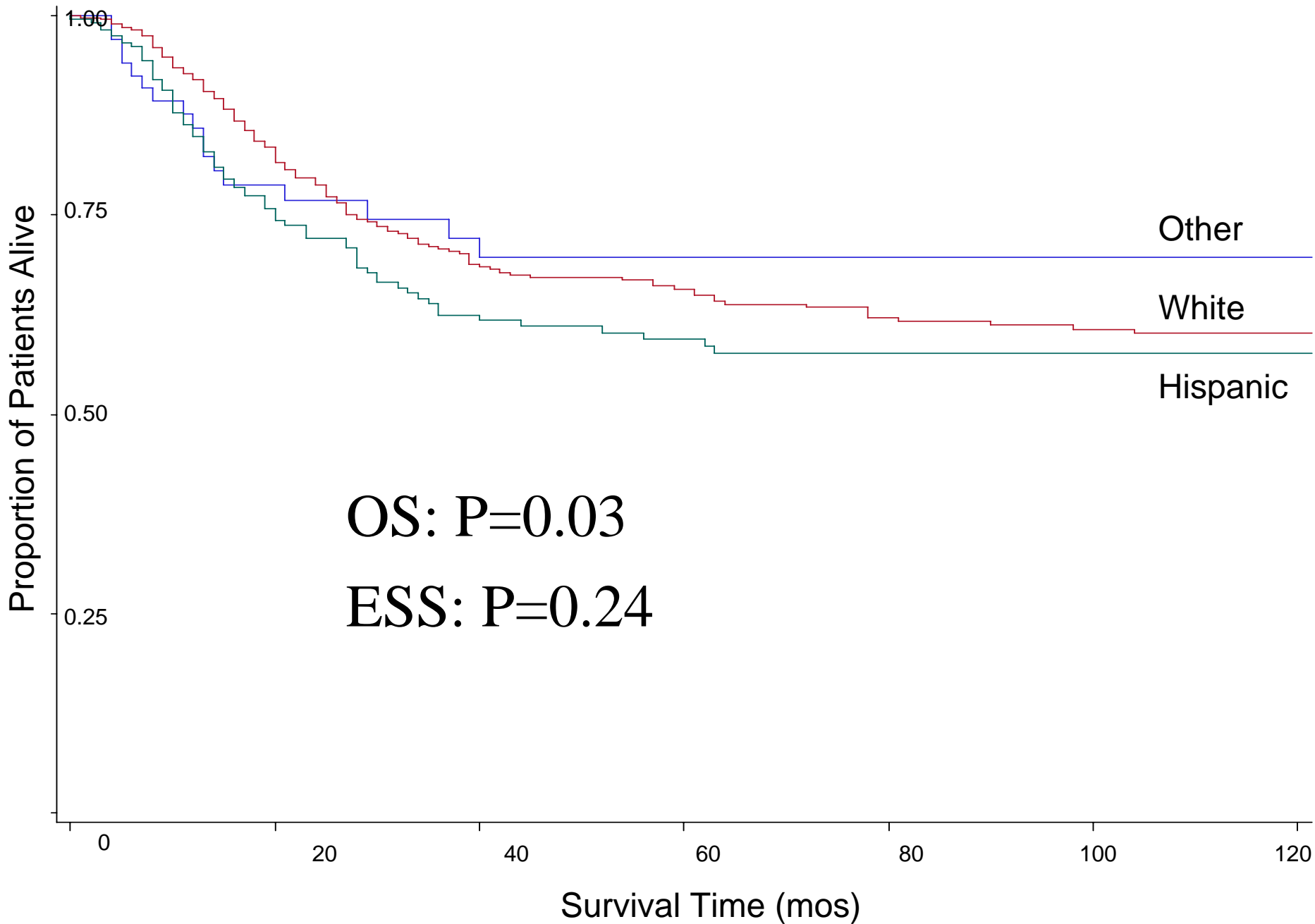
<u>Characteristic</u>	<u>No (%)</u>
Age	
Median	17
Range	0-80
Children (<18yo)	372 (51.3)
Adult	353 (48.7)
Sex	
Male	439 (60.5)
Female	286 (39.5)
Race/ethnicity	
White	414 (57.1)
Black	20 (2.8)
Hispanic	241 (33.2)
Asian/PI	44 (6.1)
Other	6 (0.8)
SES	
Lowest	148 (20.4)
Second lowest	148 (20.4)
Middle	161 (22.2)
High	122 (16.8)
Highest	146 (20.1)

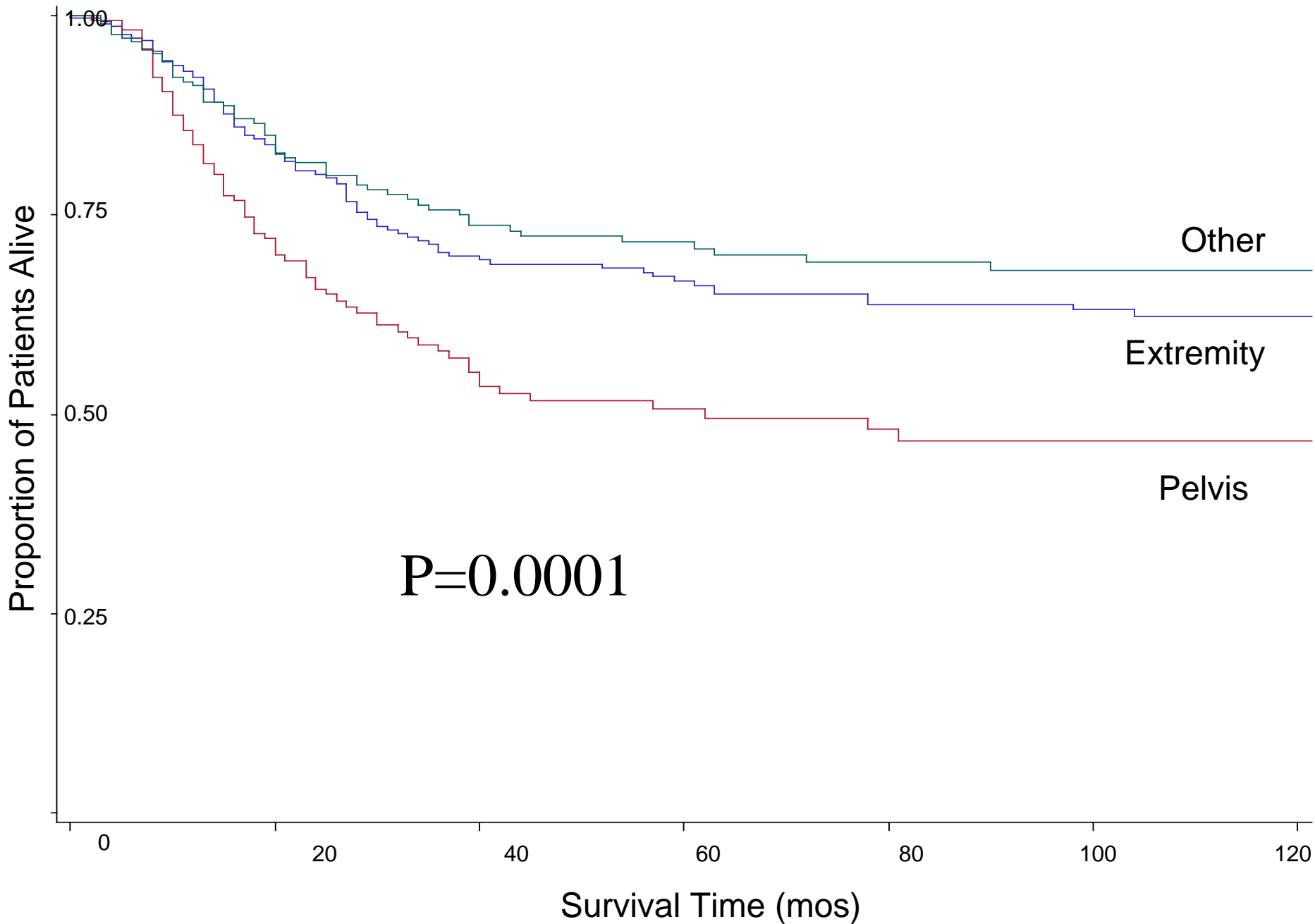
Clinicopathology

<u>Characteristic</u>	<u>No (%)</u>
Stage	
Local disease	528 (72.8)
Metastasis	197 (27.2)
Tumor size	
<8cm	164 (22.6)
8cm and greater	242 (33.4)
Anatomic site	
Head/Neck	34 (4.9)
Chest/Abd	121 (17.4)
Extremities	301 (43.3)
Spine	61 (8.8)
Pelvis	178 (25.6)
Radiation	
No	339 (46.7)
Yes	386 (53.2)
Chemotherapy	
No	50 (7.0)
Yes	664 (93.0)
Surgery	
None	318 (44.4)
Local excision/destruction	105 (14.7)
Radical excision/limb salvage	159 (22.2)
Amputation	60 (8.4)
Surgery NOS	69 (9.6)
Unknown	5 (0.7)









Results: Univariate Survival

- Metastatic vs local disease: $P < 0.0001$
- Large vs small ($< 8\text{cm}$) tumor size: $P < 0.0001$
- Nonsurgical vs surgical treatment: $P < 0.0001$
- Skeletal vs non-skeletal disease: $P = 0.49$

Results

- Hispanic race associated with young age ($P=0.001$) and lower SES ($P=0.0001$)
- Pelvic disease associated with large tumors ($P<0.0001$) and metastasis ($P<0.0002$)
- White race associated with small tumor size ($P=0.02$)
- Greater proportion of children got chemotherapy vs adults ($P<0.0001$)

Multivariate Analysis (Cox Models) of Overall and Ewing-Specific Survival				
	<u>Overall Survival Analysis</u>		<u>Ewing's Specific Survival</u>	
	Hazard Ratio (95% CI)	P value	Hazard Ratio (95% CI)	P value
Children (<18yo)	1.00*	-	1.00*	-
Adult	1.71 (1.35-2.17)	<0.0001	1.64 (1.24-2.16)	0.0005
White	1.00*	-	1.00*	-
Hispanic	1.33 (1.01-1.75)	0.04	1.2 (0.86-1.67)	0.29
Others	0.99 (0.65-1.49)	0.95	0.85 (0.5-1.43)	0.54
Lowest SES	1.00*	-	1.00*	-
Second lowest SES	0.54 (0.38-0.78)	0.001	0.55 (0.36-0.84)	0.005
Middle SES	0.57 (0.40-0.82)	0.002	0.41 (0.26-0.64)	<0.0001
High SES	0.75 (0.51-1.08)	0.12	0.65 (0.42-1.00)	0.05
Highest SES	0.67 (0.45-0.99)	0.04	0.61 (0.39-0.96)	0.03
Local disease	1.00*	-	1.00*	-
Metastasis	2.74 (2.14-3.49)	<0.0001	2.85 (2.13-3.80)	<0.0001
Tumor size <8cm	1.00*	-	-	-
Tumor size 8cm and greater	1.65 (1.17-2.34)	0.005	1.61 (1.05-2.48)	0.03
No Radiation	1.00*	-	1.00*	-
+ Radiation	0.82 (0.65-1.03)	0.09	0.75 (0.57-0.99)	0.04
No Surgery	1.00*	-	1.00*	-
Local excision/destruction	0.53 (0.35-0.79)	0.002	0.45 (0.27-0.75)	0.002
Radical excision/limb salvage	0.65 (0.47-0.91)	0.012	0.54 (0.35-0.82)	0.004
Amputation	0.78 (0.51-1.21)	0.27	0.71 (0.42-1.20)	0.2
Surgery NOS	0.82 (0.57-1.19)	0.32	0.81 (0.53-1.25)	0.79
***Also includes adjustment for sex, disease location, chemotherapy, and year of diagnosis				

Discussion

- Adult survival: co-morbidities, less aggressive treatments, different disease?
- Race?
- Location of disease vs metastasis?
- The importance of SES on survival?
- Treatment goal = surgical excision

Conclusions

- CCR has made for unique population-based study examining survival and prognostic factors in children and adults
- Many new findings with even more questions!