Identifying Geographic & Socioeconomic Disparities in Access to Care for Pediatric Cancer Patients in Texas

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- Background
- Specific Aims
- Methods
- Preliminary Results
- Future Work

- Disparities in cancer burden and access to care are well described in adults
- Poorly defined in pediatric population
- Few studies exist
- Focus only on racial & ethnic disparities
- Limited information on geographic & socioeconomic barriers to care in children

What is published in pediatric literature?

REVIEW

Disparities in Cancer Outcomes: Lessons Learned From Children With Cancer

Smita Bhatia, MD, MPH*

Pediatr Blood Cancer 2011;56:994–1002

- Comprehensive review of literature
- Most studies focus on racial variability in hematologic malignancies
- Few studies evaluate patients with solid tumors
- Few studies evaluate geographic or socioeconomic impact

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REVIEW

Disparities in Cancer Outcomes: Lessons Learned From Children With Cancer

Smita Bhatia, MD, MPH*

Pediatr Blood Cancer 2011;56:994–1002

- Why?
  - Socioeconomic & health insurance coverage
  - Access to care
  - Knowledge about cancer diagnosis, treatment, and toxicities
  - Cancer surveillance
  - Risky health behaviors
  - Disease biology

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Is mortality after childhood cancer dependent on social or economic resources of parents? A population-based study

Astri Syse[1], Torkild Hovde Lyngstad[2] and Oystein Kravdal[3]

Int. J. Cancer: **000**, 000–000 (2011) © 2011 UICC

[1] Cancer Registry of Norway, Oslo, Norway & Dartmouth Medical School, Lebanon, NH
[2] University of Oslo, Oslo, Norway & Statistics Norway, Oslo, Norway
[3] University of Oslo, Oslo, Norway & Norwegian Institute of Public Health, Oslo, Norway

- All Norwegian children diagnosed with cancer between 1974-2007
- Mortality decreased in patients with educated mothers & no siblings
- No difference associated with marital status of parents, combined earnings, mother's age at diagnosis

Pediatr Blood Cancer

The Association Between Socioeconomic Status and Survival Among Children With Hodgkin and Non-Hodgkin Lymphomas in a Universal Health Care System

Denise Darmawikarta, MPH,[1,2] Jason D. Pole, PhD,[1,2]* Sumit Gupta, MD,[3] Paul C. Nathan, MSc, MD,[3] and Mark Greenberg, MB, ChB[2,3]

Nutritional and socio-economic status in the prognosis of childhood acute lymphoblastic leukemia

Marcos Borato Viana, Rachel Aparecida Ferreira Fernandes, Benigna Maria de Oliveira, Mitiko Murao, Cybele de Andrade Paes, Antônio Alves Duarte
Department of Pediatrics, Federal University of Minas Gerais; Hematology Division, Hospital das Clinicas, Federal University of Minas Gerais, Brazil

editorial
haematologica 2001; 86:113-120
http://www.haematologica.it/2001_02/0113.htm

Influence of Socioeconomic Status on Childhood Acute Lymphoblastic Leukemia Treatment in Indonesia

Saskia Mostert, Mei N. Sitaresmi, Chad M. Gundy, Sutaryo and Anjo J. P. Veerman

Pediatrics 2006;118;e1600; originally published online October 30, 2006;

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Association Between Insurance and Socioeconomic Status and Risk of Advanced Stage Hodgkin Lymphoma in Adolescents and Young Adults

Erlyn C. Smith, MD[1,2]; Argyrios Ziogas, PhD[2,3]; and Hoda Anton-Culver, PhD[2,3]

Cancer December 15, 2012

- California Cancer Registry
- All patients with Hodgkin Lymphoma age 15-40 years
- Advanced stage HL associated with
  - Male sex
  - Lower SES
  - Uninsured or public health insurance

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Differentials in Survival for Childhood Cancer in Australia by Remoteness of Residence and Area Disadvantage

Danny R. Youlden[1], Peter D. Baade[1,2], Patricia C. Valery[3], Leisa J. Ward[1], Adele C. Green[3,5], and Joanne F. Aitken[1,4]

Cancer Epidemiol Biomarkers Prev; 20(8) August 2011

- Population-based data from Australian Paediatric Cancer Registry
- Australian Standard Geographical Classification Remoteness Areas
- Index of Relative Socioeconomic Disadvantage

Differentials in Survival for Childhood Cancer in Australia by Remoteness of Residence and Area Disadvantage

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Cancer Epidemiol Biomarkers Prev; 20(8) August 2011

- Children from remote/very remote areas lower survival rate (HR 1.55, 95% CI 1.08-2.23)

- Trend towards lower survival in patients from most disadvantaged areas (p=0.051)

Diagnosis Delays in Childhood Cancer

A Review

Tam Dang-Tan, MSc
Eduardo L. Franco, DrPH

CANCER August 15, 2007 / Volume 110 / Number 4

- Literature review on diagnosis delays in childhood cancer
- 3 Categories: patient and/or parent, disease and healthcare system
- Healthcare factors included distance, number of visits, and first health professional contacted
- Mixed results

- No previous studies evaluate the impact of geography on pediatric cancer burden and outcomes in US
- Few studies evaluate socioeconomic factors related to pediatric cancer
- Texas provides geographic, racial & socioeconomic diversity in a large population

Specific Aim 1

- 1A – To determine if patient distance to definitive cancer care impacts stage at diagnosis.
- 1B – To determine if patient distance to definitive cancer care impacts survival.

Hypotheses

- Patients with longer distances to definitive cancer care present with later stage disease.
- Patients with longer distances to definitive cancer care have worse overall survival.

Data Sources

- Texas Discharge Data
  - To identify pediatric cancer treatment centers & map centers
- Texas Cancer Registry
  - All pediatric (age ≤ 18 years) patients included in TCR between 1995 and 2009

Independent Variables

- Distance
  - Miles from residence to pediatric cancer treatment center
- Confounders
  - Age
  - Sex
  - Race
  - Stage (except leukemia patients)

Dependent Variables

- Stage at diagnosis
  - Exclude leukemia patients
- Median survival & mortality risk

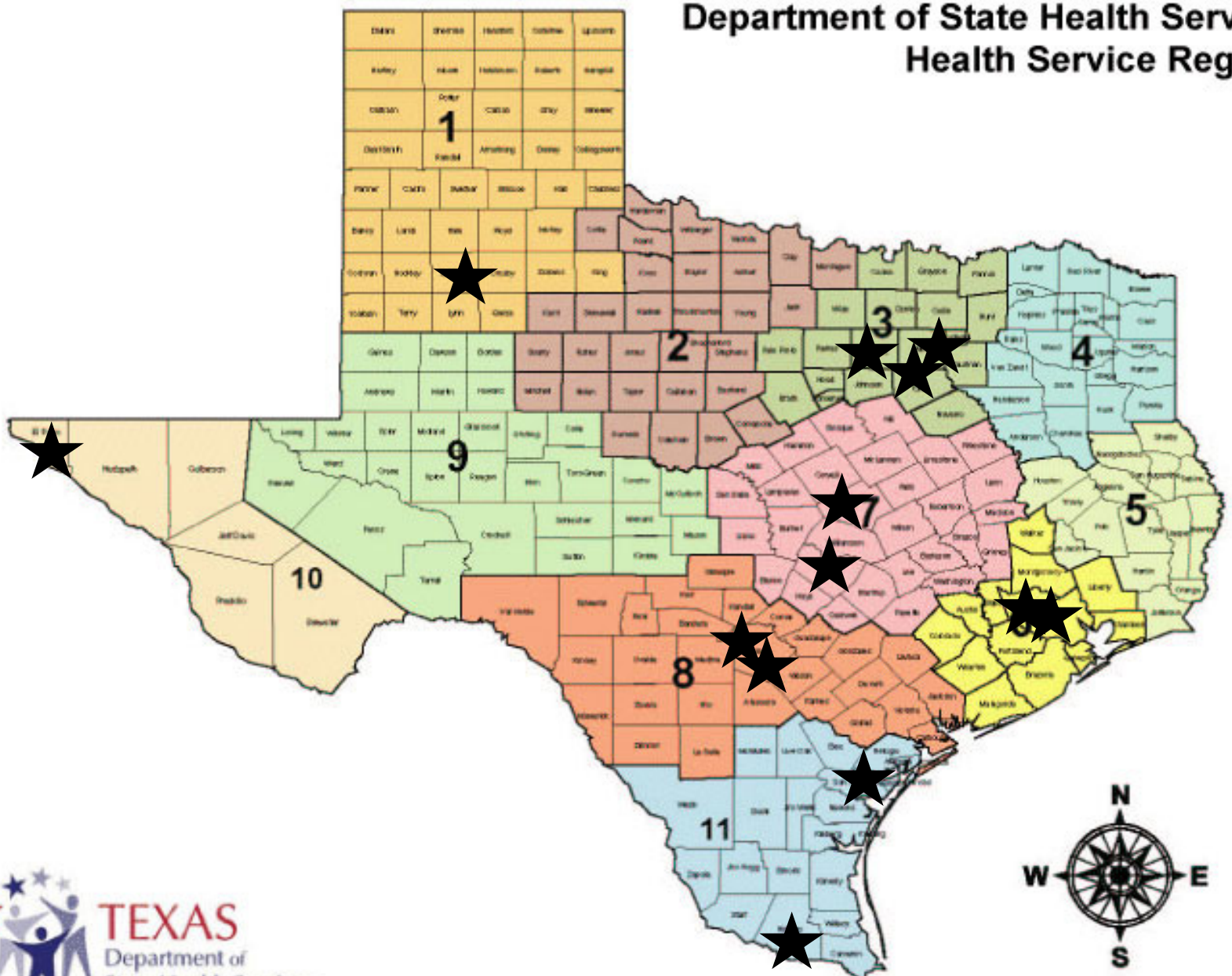
Diagnostic Groups

- Leukemia
  - Acute lymphoblastic leukemia (ALL)
  - Acute myeloid leukemia (AML)
- Lymphoma
- CNS solid tumor
- Non-CNS solid tumor
- Retinoblastoma

Statistical Analysis

- Logistic regression
- Kaplan-Meier survival analysis
- Cox proportional hazards model

Department of State Health Services
Health Service Regions



TEXAS
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State Health Services

Pediatric Cancer Treatment Centers in Texas

1. Children's Medical Center Dallas, Dallas
2. Cook Children's Medical Center, Fort Worth
3. Covenant Children's Hospital, Lubbock
4. Dell Children's Medical Center of Central Texas, Austin
5. Doctor's Hospital-Renaissance, McAllen
6. Driscoll Children's Hospital, Corpus Christi
7. MD Anderson Cancer Center, Houston
8. Medical City Dallas Hospital, Dallas
9. Methodist Children's Hospital of South Texas, San Antonio
10. Providence Memorial Hospital, El Paso
11. Scott and White Memorial Hospital, Temple
12. Texas Children's Hospital, Houston
13. Christus Santa Rosa Children's Hospital, San Antonio

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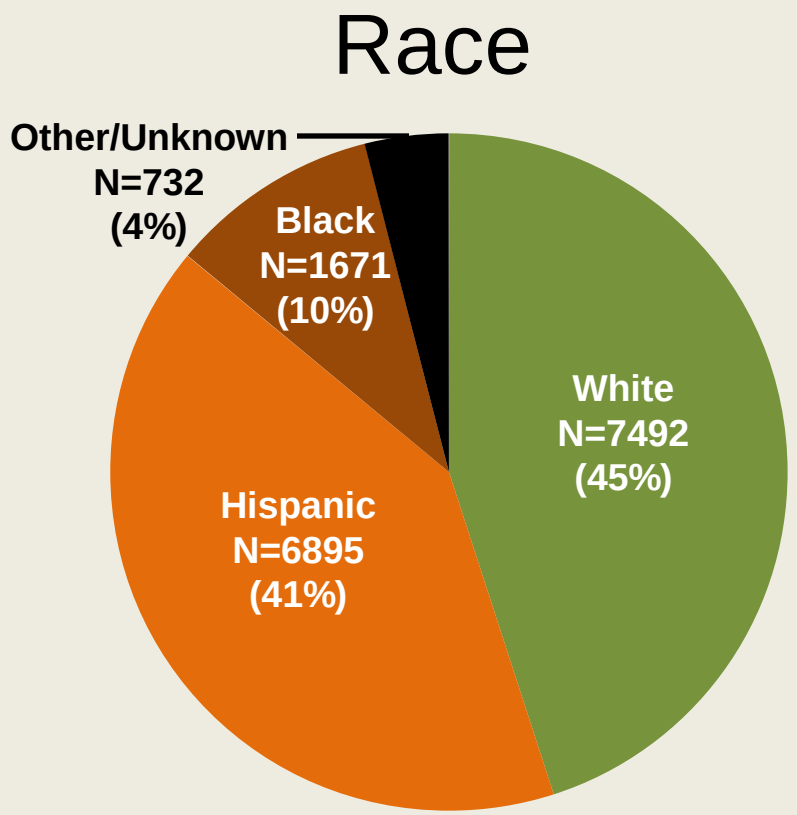
Demographic Results

- 16,790 patients
- 54% male



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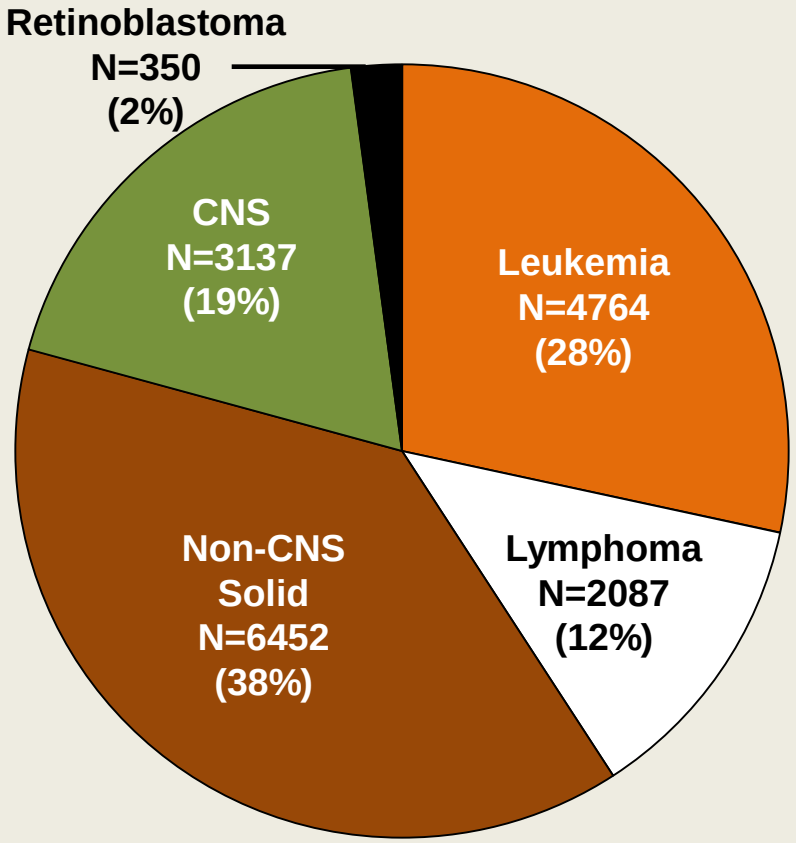
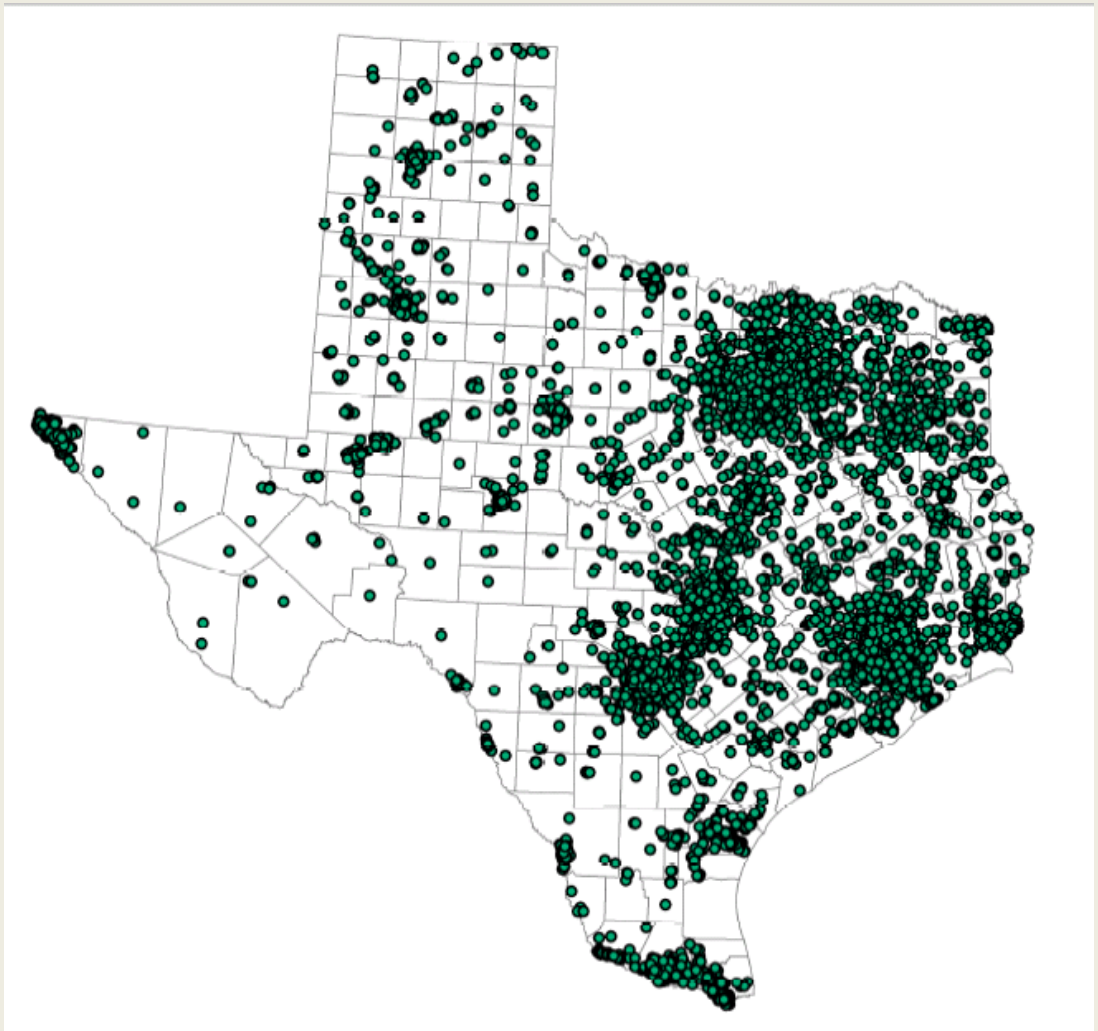
Diagnostic Groups



Pediatric Cancer Cases in Texas



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Distance

- Median distance 15.4 miles
- Range 0.01-224 miles
  - 65% < 25 miles
  - 14% 25-49 miles
  - 11% 50-99 miles
  - 10% 100 or more miles

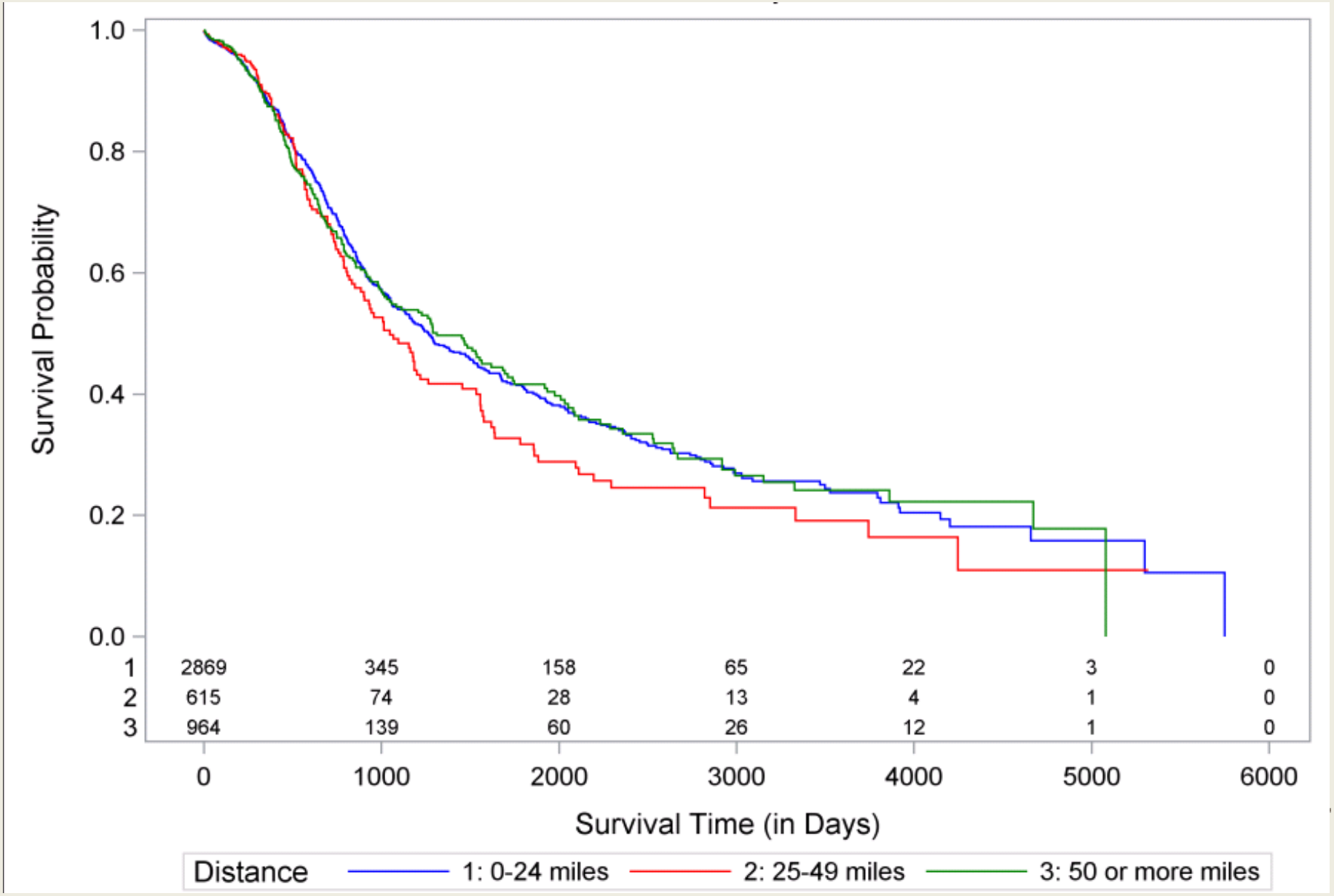
Does distance affect stage?

- No association between median distance to a treatment center and stage at presentation
- No association between categorical distance and stage at presentation

Does distance affect survival?

- No association between distance and risk of mortality
- No association between distance and survival

Survival Estimates for Children with Non-CNS Solid Tumors



Multivariate Cox Proportional Hazard Model Leukemia

Variable		Hazard Ratio	95% CI	p
Sex	Female	1.078	0.948, 1.226	0.25
Race	Black	1.331	1.045, 1.697	0.02*
	Hispanic	1.334	1.165, 1.550	<0.0001*
	Other	0.891	0.576, 1.377	0.60
Age (mos)		1.003	1.002, 1.004	<0.0001*

Multivariate Cox Proportional Hazard Model Lymphoma

Variable		Hazard Ratio	95% CI	p
Sex	Female	0.952	0.727, 1.245	0.7
Race	Black	1.477	1.012, 2.155	0.04*
	Hispanic	0.947	0.704, 1.273	0.7
	Other	0.459	0.145, 1.454	0.2
Age (mos)		0.997	0.995, 0.999	<0.01*
Stage	Regional	1.166	0.767, 1.774	0.5
	Distant	2.038	1.455, 2.853	<0.0001*

Multivariate Cox Proportional Hazard Model CNS Solid Tumors

Variable		Hazard Ratio	95% CI	p
Sex	Female	1.040	0.895, 1.207	0.6
Race	Black	1.427	1.128, 1.805	<0.01*
	Hispanic	1.419	1.203, 1.674	<0.0001*
	Other	1.393	0.921, 2.106	0.1
Age (mos)		0.997	0.996, 0.998	<0.0001*
Stage	Regional	1.321	1.065, 1.639	0.01*
	Distant	1.790	1.410, 2.273	<0.0001*

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Multivariate Cox Proportional Hazard Model Non-CNS Solid Tumors

Variable		Hazard Ratio	95% CI	p
Sex	Female	0.942	0.829, 1.070	0.4
Race	Black	1.433	1.178, 1.743	<0.001*
	Hispanic	1.069	0.931, 1.229	0.3
	Other	0.872	0.567, 1.342	0.5
Age (mos)		0.998	0.997, 0.999	<0.0001*
Stage	Regional	1.702	1.420, 2.039	<0.0001*
	Distant	3.722	3.181, 4.355	<0.0001*

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Specific Aim 2

- 2A - To determine if patient's socioeconomic status impacts stage of disease at presentation.

- 2B - To determine if patient's socioeconomic status impacts survival.

Limitations

- Confounding variables differ between specific cancer diagnoses
- Treatment variability
  - Type, intensity, frequency, duration
- Age significant but not linear
- Missing data

Future Work

- Does distance affect time from diagnosis to 1st treatment?
- Adherence to COG treatment protocols
- Financial burden for traveling families

Thank You

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Melanie Williams, PhD

cercit
Comparative Effectiveness Research on Cancer in Texas

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