The Association between Insurance Status and Childhood Cancer Survival

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Background

- ~10,400 cancers diagnosed in U.S. children 0-14 years expected in 2016
- ~1,300 will die from their disease

Sources: Cancer Facts and Figures 2016, American Cancer Society & SEER 9, 1973-2008
Insurance Status and Risk of Cancer Mortality Among Adolescents and Young Adults

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• **Methods**
  – Patients diagnosed at ages 15-39 years between 2007-2010 were ascertained from the SEER 18 registries

• **Results**
  – Patient with nonprivate insurance were more likely to have more advanced-stage cancer and a higher risk of death.
    • [HR 3.2 (95% CI: 3.0-3.5), HR 2.9 (95% CI:2.2-3.9), respectively]
Research Objective

To examine the association between insurance status and childhood cancer survival in the United States
Methods

• Data Source: SEER 18 registries
• Eligibility Criteria:
  – 0-14 years at diagnosis
  – Diagnoses between 2007-2013
• Variables:
  – Insurance (Insured, Medicaid/Uninsured)
  – Ethnicity (White, non-Hispanic, Black, non-Hispanic, Hispanic and Other)
  – County level poverty (<5%, 5-9.99%, 10-19.99% and ≥20%)
• Statistical Method:
  – Cox proportional hazard regression
Characteristics of Childhood Cancer Cases

• A total of 19,135 individuals were included

![Pie chart showing gender distribution]

- Male: 53.8%
- Female: 46.2%
Characteristics of Childhood Cancer Cases cont’d

- White, non-Hispanic: 48.6%
- Black, non-Hispanic: 9.5%
- Hispanic: 30.8%
- Other: 11.1%
Characteristics of Childhood Cancer Cases cont’d

- Private: 61.2%
- Medicaid: 37.0%
- Uninsured: 1.8%
Characteristics of Childhood Cancer Cases cont’d

- Leukemias: 32.9%
- Lymphomas: 10.2%
- CNS: 20.9%
- Bone Tumors: 4.5%
- Neuroblastoma: 6.7%
- Retinoblastoma: 2.7%
- Renal Tumors: 5.1%
- Bone Tumors: 4.5%
- Soft Tissue Sarcomas: 6.8%
- Germ Cell Tumors: 3.6%
- Other: 4.7%
## Associations between Insurance Type and Childhood Cancer Survival

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>N (% Died)</th>
<th>HR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>19,135 (11.5)</td>
<td>1.07 (0.98-1.18)</td>
</tr>
<tr>
<td>Leukemia</td>
<td>6,295 (9.2)</td>
<td>1.08 (0.91-1.30)</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>1,952 (4.0)</td>
<td>1.02 (0.63-1.66)</td>
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<tr>
<td>CNS</td>
<td>3,993 (20.1)</td>
<td>0.95 (0.82-1.11)</td>
</tr>
<tr>
<td>Neuroblastoma</td>
<td>1,285 (12.9)</td>
<td><strong>1.45 (1.03-2.05)</strong></td>
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<tr>
<td>Retinoblastoma</td>
<td>524 (2.1)</td>
<td>0.48 (0.12-1.87)</td>
</tr>
<tr>
<td>Renal tumors</td>
<td>973 (5.3)</td>
<td>0.78 (0.43-1.41)</td>
</tr>
<tr>
<td>Hepatic tumors</td>
<td>353 (15.3)</td>
<td>1.23 (0.66-2.30)</td>
</tr>
<tr>
<td>Bone tumors</td>
<td>864 (16.2)</td>
<td>1.05 (0.72-1.54)</td>
</tr>
<tr>
<td>Soft tissue sarcomas</td>
<td>1,300 (17.0)</td>
<td><strong>1.48 (1.10-1.98)</strong></td>
</tr>
<tr>
<td>Germ cell tumors</td>
<td>693 (4.3)</td>
<td>0.61 (0.25-1.45)</td>
</tr>
<tr>
<td>Other</td>
<td>903 (6.3)</td>
<td>1.40 (0.80-2.47)</td>
</tr>
</tbody>
</table>

* Adjusted for patient age, sex, ethnicity and county poverty level
Association between Childhood Cancer Survival and Age

Age group (years) | HR
---|---
10-14 (ref.) | 1.0
<1 | 1.5
1-4 | 0.9
5-9 | 0.9
Association between Childhood Cancer Survival and Ethnicity

- White, non-Hispanic (ref.): 1.0
- Black, non-Hispanic: 1.5
- Hispanic: 1.3
- Other: 1.4
Association between Childhood Cancer Survival and County Poverty Level

![Bar chart showing the association between county poverty level and childhood cancer survival. The chart indicates higher hazard ratios (HR) for higher poverty levels.](image-url)
Strengths

• First population-based study to examine the association between insurance status and childhood cancer survival

• Large sample size

• High quality cancer registry data
Limitations

• Cannot infer causality between insurance status and childhood cancer survival

• The insurance variable is subject to misclassification

• Factors such as parental education or treatment weren’t included
Conclusions and Implications

• Overall, insurance status was not associated with childhood cancer survival

• Even after adjusting for insurance status, socio-demographic and economic factors are associated with childhood cancer survival

• Further study is recommended to understand the underlying reasons for these patterns
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