PAPER 46

**TITLE:** Using the Social Vulnerability Index to Assess Social Determinants of Bone Cancer Care & Prognosis in the United States

**Running Title:** Social Vulnerabilities of Bone Cancer

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**Level of Evidence: III**

## ABSTRACT

**Background:** Prior investigations in social determinants of health (SDoH) in primary bone cancers (PBC) have analyzed socioeconomic status and race-ethnicity for significant contributions to disparities in outcomes and treatment course[1–7]. However they have been limited by the narrow scope of PBC, SDoH, and geographic-span of study population. Furthermore, present literature lacks the inquiry on the interrelational contribution of SDoH on PBC-disparities across a wide variety of SDoH, as well as determining which SDoH have the most impact on disparities.

**Question/Purposes:** Utilizing the CDC-Social Vulnerability Index (SVI) and NCI-Surveillance, Epidemiology, and End Results Program (SEER), our study assessed the impact of a variety of SDoH and their amalgamated influence on adults PBCs across the US. In turn, we sought to answer the following questions: 1) How do SDoH, as measured by the SVI, contribute to PBC care and prognosis disparities in the contexts of each other? 2) Which SDoH relay the most impact on the observed associated disparities in PBC?

**Patients & Methods:** This retrospective cohort study of 13,664 adult PBC patients from the 1975-2017 SEER database assessed for significant linear trends in months under surveillance/follow-up and survival across PBC-disease classes with increasing overall social vulnerability, as well as vulnerability in socioeconomic status, minority-language status, household composition, and housing-transportation that are measured by the SVI. SVI measures are based on the US Census and are ranked/compared across all US Census Tracts and Counties for relative vulnerability in a specific SDoH theme/category and the total composite of these themes.

**Results:** Nationwide, 13,664 PBC patients were identified from 1975 to 2017. With increasing total SVI/overall social vulnerability, significant decreases in months of follow-up/surveyed were observed for chondrosarcomas (p<0.001), chordomas (p<0.001), Ewing sarcoma (p=0.026), malignant giant cell tumors (p=0.007), NOS Malignant Neoplasms (p=0.015), NOS or other Sarcomas (p=0.009), and osteosarcomas (p<0.001), ranging from 20.62-51.07% decreases in mean lengths of care when comparing the lowest to highest vulnerability cohorts (**Figure 1**). For months survival, increasing overall SVI score showed significant decreases with chondrosarcomas (p<0.001) and chordomas (p=0.002), featuring 44.08% and 31.30% decreases in mean months survival respectively when

comparing the lowest to highest vulnerability cohorts (**Figure 2**). Increasing SVI-theme subscores/vulnerability within specific SDH categories contributed significantly to the total-SVI trends in months surveyed and survival, with socioeconomic status, minority-language status, household composition, and housing-transportation showing varying magnitudes of impact across PBCs (**Figures 1-2**).

**Conclusions:** Our results showcase significant decreases in care and prognosis of PBC patients across the United States with increasing overall social vulnerability and characterize which SDoH contribute more to disparity trends as measured by SVI-theme subscores. Our study lays important groundwork for informing PBC-providers which SDoH should be addressed to relay the most benefit against PBC-disparities.
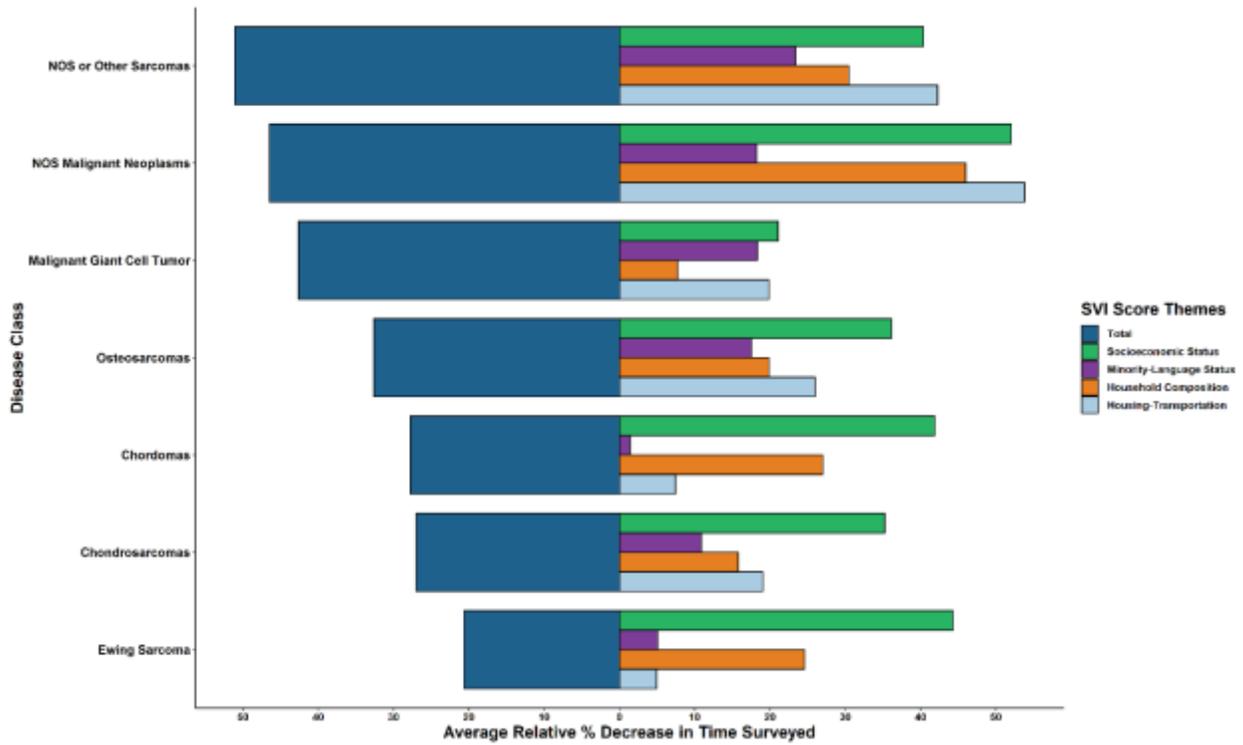


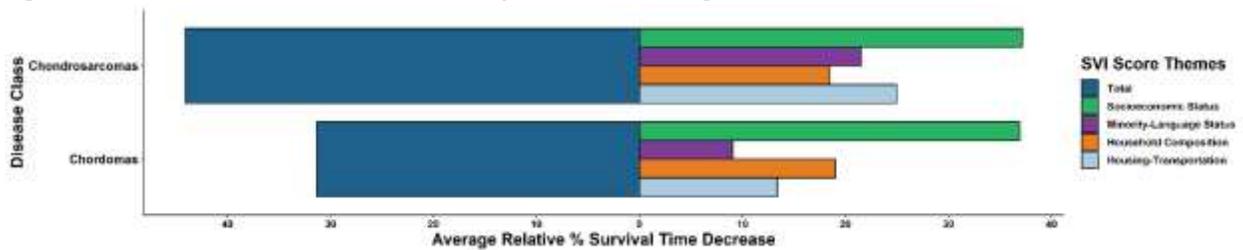**Figure 1. Relative Decreases in Months Surveyed with Increasing SVI**



**Figure 2. Relative Decreases in Months Survival with Increasing SVI**

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