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Cancer has long been recognized as a cause of death in the US. Social vulnerability Index (SVI), which consists of non-medical factors such as socioeconomic status (SES), race, and ethnicity that influence health outcomes, are known to contribute to disparities in cancer incidence and mortality. While the previous studies have analyzed only a specific kind of disease site in isolated geographic regions, limited studies have investigated the comprehensive association between historical redlining and cancer-related hospital utilization. This study aimed to explore the complex relationship between environmental risk, cancer-related hospital utilization, Social Vulnerability Index (SVI), and historical redlining using Structural Equation Modeling (SEM). This study conducted three path model to confirm relationships between variables with ZCTA level: (1) Path model 1 – Environmental risk, cancer-related hospital utilization and Social Vulnerability Index (SVI) in TX (n=1,935); (2) Path model 2 – Including Redlining for Model 2 in TX (n=1,935); (3) Path model 3 – Only for county having a Redlining (n=608). Then, we analyzed spatial association to compensate for spatial autocorrelation, utilizing spatial statistical models (SEM and SLM) and ordinary least squares. The results revealed that there are significant relationship between Environmental risk, SVI, cancer-related hospital utilization, and Redlining. Notably, Redlining impacted SVI and Environmental risk, ultimately affecting cancer-related hospital utilization. The results suggest that cancer-related hospital utilization is affected not only by the individual's socio-economic status but also by the residential segmentation due to structural discrimination. Such insights hold significance for informing policy decisions and healthcare strategies at both local and state levels.